

AMENDMENTS TO THE CLAIMS

Claim 1. (Currently Amended)

A system for sending and receiving serial data, comprising:

a plurality of secondary stations each configured for receiving a refresh request and a synchronization request in a determined time, and for sending one of data and a response to a primary station; and

the primary station configured for sending the refresh request and a polling request asking for sending data, and for retrying one of the polling request and the refresh request within the same determined time to all secondary stations from which the primary station failed to receive one of the data and the response, the primary station further configured for sending the synchronization request simultaneously to the plurality of the secondary stations,

where each of the plurality of secondary stations is designated as one of an input type or output type secondary station and wherein the refresh request is a request to an output type secondary station to output data external to the system, the output type secondary station being designated to output data from the system, where the synchronization request is a request to an input type secondary station to prepare data, and the polling request is a request to the input type secondary station to send data to the primary station, the input type secondary station being designated to prepare and input data to the primary station.

Claim 2. (Previously Presented)

The system for sending and receiving the serial data of claim 1, wherein the primary station includes a retry number counter for counting one of a polling request retried and a refresh

request retried, wherein retrying of one of the polling request and the refresh request is stopped after one of a determined number and determined time has passed.

Claim 3. (Previously Presented)

The system for sending and receiving the serial data of claim 2, wherein the primary station includes a record corresponding to each of the secondary stations, wherein a retry flag is set, when a normal response is not received, wherein the retry flag remains in the record corresponding to each of the secondary stations after stopping retrying of one of the polling request and the refresh request.

Claim 4. (Original)

The system for sending and receiving the serial data of claim 1, wherein the secondary station responds in a response frame of a compact type by using a flag code which is different from a flag code of the primary station.

Claim 5. (Original)

The system for sending and receiving the serial data of claim 1, wherein the secondary station returns a busy response, when data for responding for the polling request from the primary station are failed to be prepared, wherein the primary station retries a polling request for the secondary station which has sent the busy response.

Claim 6. (Original)

The system for sending and receiving the serial data of claim 1, wherein the primary station stores information on a type for each of the secondary stations, wherein the primary station skips sending the polling request in the determined time for the secondary station having failure to respond within the determined time.

Claim 7. (Original)

The system for sending and receiving the serial data of claim 1, wherein the primary station stores information on a type for each of the secondary stations, wherein the primary station ignores data from the secondary station having failure to respond within the determined time.

Claim 8. (Original)

The system for sending and receiving the serial data of claim 1, wherein the primary station stores an error state of each of the secondary stations, wherein the primary station sends an initialization request to the secondary station, when the secondary station in the error state returns to a normal response state.

Claim 9. (Original)

The system for sending and receiving the serial data of claim 8, wherein the primary station stores information of a type for each of the secondary stations, wherein the primary

station collects information of the secondary station before sending and compares the collected information with the information of the type before sending the initialization request.

Claim 10. (Original)

The system for sending and receiving the serial data of claim 1, wherein one of the primary station and the secondary station sends a high level signal for a short period after sending a frame.

Claim 11. (Currently Amended)

A system for sending and receiving serial data comprising:
a primary station configured for sending a refresh request and a polling request in a specific order without having each secondary station address in a determined time; and

a plurality of secondary stations for responding to the primary station, following to the specific order, where each of the plurality of secondary stations is designated as one of an input type or output type secondary station and

wherein the primary station is also configured to retry the refresh request and the polling request within the determined time to all of the plurality of secondary stations that failed to respond to the refresh request and the polling request, and

wherein the refresh request is a request to an output type secondary station to output data external to the system, the output type secondary station being designated to output data from the system and the polling request is a request to an input type secondary station to send data to the

primary station, the input type secondary station being designated to prepare and input data to the primary station.

Claim 12. (Previously Presented)

The system for sending and receiving the serial data of claim 11, wherein the secondary station has one of a counter and a timer monitoring a response from another secondary station and time, and makes a response of its own station after one of a respectively set order and time.

Claim 13. (Original)

The system for sending and receiving the serial data of claim 12, wherein the secondary station has a monitoring responder for responding to the primary station in a determined order after the response time is passed in monitoring.

Claim 14. (Original)

The system for sending and receiving the serial data of claim 11, wherein the primary station provides a field for showing that a normal response to the refresh request for the secondary station can be skipped, wherein the secondary station stops a normal refresh response based on the field.

Claim 15. (Original)

The system for sending and receiving the serial data of claim 14, wherein the primary station provides a field for showing that an error report from the secondary station is possible in

the refresh response, wherein the secondary station has a monitor for monitoring an error in an own station, wherein the secondary station returns an error response based on the field.

Claim 16. (Currently Amended)

A method for sending and receiving serial data having a plurality of secondary stations each configured for receiving a refresh request and a synchronization request from a primary station and sending data to the primary station responding to a polling request, the method comprising:

simultaneously sending the synchronization request to the plurality of the secondary stations; where each of the plurality of secondary stations is designated as one of an input type or output type secondary station, and

retrying for sending one of the refresh request and the polling request to all of the plurality of secondary stations within a determined time which has not provided a normal response,

wherein the refresh request is a request to an output type secondary station to output data external to the system, the output type secondary station being designated to output data from the system, where the synchronization request is a request to an input type secondary station to prepare data, and the polling request is a request to the input type secondary station to send data to the primary station, the input type secondary station being designated to prepare and input data to the primary station.

Claim 17. (Original)

The method for sending and receiving the serial data of claim 16, wherein the primary station includes a retry number counter for counting one of the polling request retried and the refresh request retried, and wherein the primary station stops retrying for sending one of the refresh request and the polling request.

Claim 18. (Original)

The method for sending and receiving the serial data of claim 16, further comprising:
responding in a response frame of a compact type from the secondary station by using a flag code, which is different from a flag code of the primary station.

Claim 19. (Original)

The method for sending and receiving the serial data of claim 16, further comprising:
returning a busy response from the secondary station, when data for responding for the polling request from the primary station are failed to be prepared; and
retrying for sending a polling request from the primary station to the secondary station which has sent the busy response.

Claim 20. (Previously Presented)

The method for sending and receiving the serial data of claim 16, further comprising:
storing information on a type for each of the secondary stations in the primary station;
and

skipping sending the polling request in the determined time from the primary station to the secondary station having failure to respond within the determined time.

Claim 21. (Currently Amended)

A system for sending and receiving serial data, comprising:

a plurality of secondary stations configured to send data in response to one of a refresh request and a polling request where each of the plurality of secondary stations is designated as one of an input type or output type secondary station; and

a master station operably connected to said secondary stations, said master station configured to perform first and second sequence determinations in a predetermined fixed period of time,

said master station determining the first sequence of responses by sequentially sending one of a refresh request and a polling request to each secondary station and recording a response from each secondary station,

said master station determining the second sequence of responses by sequentially sending one of the refresh request and the polling request to each of the plurality of secondary stations associated with an abnormal response in the first sequence of responses,

wherein the refresh request is a request to an output type secondary station to output data external to said system, the output type secondary station being designated to output data from the system and the polling request is a request to an input type secondary station to send data to said master station, the input type secondary station being designated to prepare and input data to the primary station.

Claim 22. (Previously Presented)

The system of claim 21, wherein:

each of the plurality of the secondary stations is configured to prepare the data in response to a synchronization request; and

the master station is configured to simultaneously send the synchronization request to the plurality of the secondary stations.

Claim 23. (Previously Presented)

The system of claim 21, wherein the abnormal response includes a busy response and a time out.

Claim 24. (Currently Amended)

A method for sending and receiving serial data, comprising:

determining a first sequence of responses by sequentially sending one of a refresh request and a polling request to each of a plurality of secondary stations and recording a response from each secondary station; and

determining a second sequence of responses by sequentially sending one of the refresh request and the polling request to each of the plurality of secondary stations associated with an abnormal response in the first sequence of responses,

wherein the first and second sequences of responses are determined within a predetermined fixed period of time, and

where each of the plurality of secondary stations is designated as one of an input type or output type secondary station and wherein the refresh request is a request to an output type secondary station to output data external to said system, the output type secondary station being designated to output data from the system and the polling request is a request to an input type secondary station to send data to said master station, the input type secondary station being designated to prepare and input data to the primary station.

Claim 25. (Previously Presented)

The system of claim 24, wherein:
simultaneously sending a synchronization request to the plurality of secondary stations; and
preparing data for each secondary station in response to the synchronization request.

Claim 26. (Previously Presented)

The system of claim 24, wherein the abnormal response includes a busy response and a time out.

Claim 27. (Currently Amended)

A system for sending and receiving serial data, comprising:
a plurality of secondary stations where each of the plurality of secondary stations is designated as one of an input type or output type secondary station and one or more input type secondary stations each configured for preparing data for transfer in response to a

synchronization request from a primary station and configured for transferring the prepared data to the primary station in response to a polling request from the primary station;

one or more output type secondary stations each configured for preparing and transferring data externally from the system and sending an acknowledgement to the primary station in response to a refresh request from the primary station; and

the primary station configured for sending the synchronization requests to all input type secondary stations, sending refresh requests to all output type secondary stations, sending polling requests to all input type secondary stations, and receiving data from all input type secondary stations, all in a predetermined fixed period of time,

wherein the primary station is also configured for detecting abnormal responses from the one or more input type secondary stations and from the one or more output type secondary stations and configured to retry the polling requests to abnormally responding input type secondary stations and the refresh requests to abnormally responding output type secondary stations, all within the predetermined fixed period of time.

Claim 28. (Previously Presented)

The system of claim 27, wherein the primary station is configured for sending the synchronization requests to all input type secondary stations simultaneously.

Claim 29. (Previously Presented)

The system of claim 28, wherein the primary station is configured for sending the polling requests to all input type secondary stations sequentially.

Claim 30. (Previously Presented)

The system of claim 27, wherein the primary station is configured for sending the polling requests to all abnormally responding input type secondary stations sequentially.

Claim 31. (Previously Presented)

The system of claim 28, wherein the primary station is configured for sending the refresh requests to all output type secondary stations sequentially.

Claim 32. (Previously Presented)

The system of claim 27, wherein the primary station is configured for sending the refresh requests to all abnormally responding output type secondary stations sequentially.

Claim 33. (Previously Presented)

The system of claim 27, wherein the primary station is configured for individualizing the refresh request for each output type secondary station.

Claim 34. (Previously Presented)

The system of claim 33, wherein the primary station is configured for packaging individualized data that a particular output type secondary station outputs external to the system in the individualized refresh request.